

hCG as a diagnostic test to differentiate between Parathyroid Carcinoma, Primary Benign Hyperparathyroidism and Secondary Hyperparathyroidism

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Background:

Parathyroid carcinoma (PCa) is a rare presentation of primary hyperparathyroidism (PHPT), accounting for less than 1 % of cases. Differentiating parathyroid cancer from benign hyperparathyroidism is clinically challenging. Some previous work suggest paraneoplastic hCG production in parathyroid cancer (Stock et al 1987, Rubin et al 2008). In this study, we aimed to investigate whether the hCG+β kit from Roche Diagnostics could distinguish PCa patients from primary and secondary hyperparathyroidism. Additionally, we validate hCG levels according to renal function and determine hCG test sensibility and specificity to diagnose parathyroid cancer.

Material and methods:

We studied a series of 8 patients suffering from advanced PCa, referred to the CHU de Liege. A control group of 20 PHPT patients and 25 patients with chronic renal failure and secondary hyperparathyroidism (SHP) were used as comparative. hCG+β kit on Cobas (Roche Diagnostics) uses 2 monoclonal antibodies that recognize holo-hCG, nicked hCG, β-core fragment and free β-subunit. Limits of hCG detection and quantification are <0.1 and <0.6 mUI/mL. In non pregnant and postmenopausal women and in men, hCG (p95) is <1 (5.3), <7 mUI/mL (8.3) and <2 (2.6) mUI/mL, respectively.

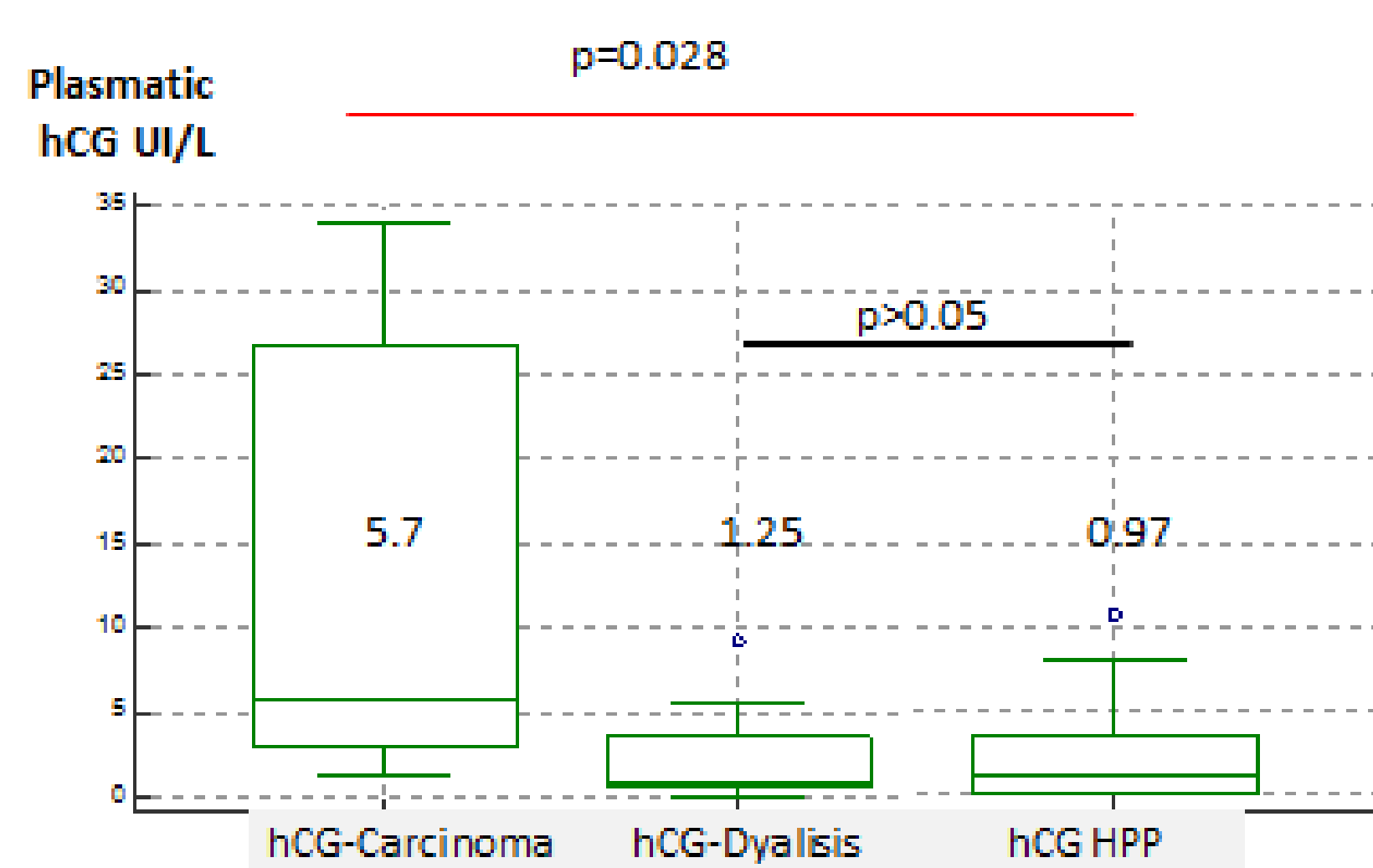
1- Parathyroid cancer patients

	Gender	hCG UI/L <1.2	PTH 3rd ng/ml 4-33	Ca mmol/L 2.15-2.60	Creat mg/dl 0.72-1.18
Normal values					
MK	F	1,29	328,2	2,65	1.27
QM	F	3,46	806	3,23	0.97
MWU	F	36,5	7284	3,55	0.98
BW	M	24,2	725,1	2,89	0.88
BB	M	5,7	595,1	3,1	1.52
CC	M	34,1	1093,5	3,85	1.18
TM	F	164	1117,7	3,7	1.1
KJ	M	31,2	2930	3	1.2
hCG correlates to:			P<0.05	P=0.05	?

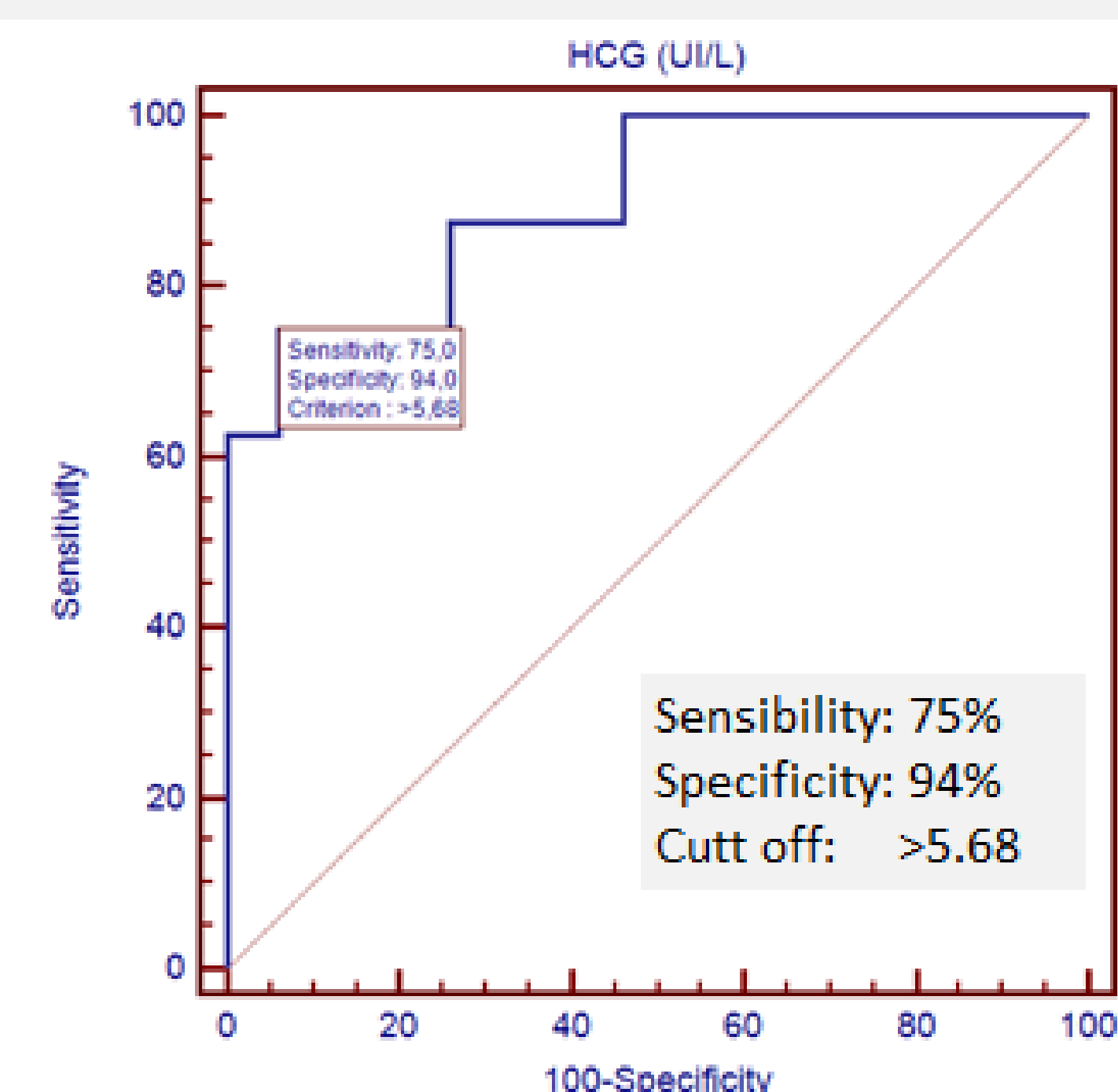
2- Does hCG levels correlate to renal function?

	PTH carcinoma	HPP	Hemodialysis
Creatinine ng/dl (median , IC)	1.18 (IC:0.94-1.13)	0.8 (IC: 0,7-0,9)	9.7 (IC: 7.4-10.7)
hCG UI/L (median , IC)	5.7 (IC: 2-26)	1.25 (IC 0-3.3)	0.97 (IC 0.6-2.6)
Correlation r	-0.02	-0.3	-0.3
P	0,89	0.79	0.59
No significant correlations !			

3- hCG as a tumor marker



4- Serum hCG as a test



Results:

The eight PCa patients (3 women) presented high serum hCG values at: 1.29, 3.46, 5.7, 24.2, 31.2, 34.1, 36.5 and 164 mUI/mL. Values of 1.29 and 3.46 were obtained in 2 postmenopausal women. The lowest value was presented by the only still alive patient. In cancer patients, there was a significant correlation ($r=0.786$; $p < 0.05$) between hCG and PTH and median hCG (5.7 mUI/ml) was significantly higher than in PHP (1.25 mUI/ml) and SHP (0.97 mUI/ml). hCG test sensitivity was 75 % and specificity was 94% to detect parathyroid cancer, with a cutt off hCG levels of more than 5.68 mUI/.

Conclusions:

These results suggest that serum hCG might have the potential to discriminate between parathyroid adenomas and carcinomas, with a sensibility of 75% and a specificity of 94, and a cut off of 5.68 mUI/L. The only patient still alive presented the lowest hCG values. If hCG could be predictive of PCa survival needs to be studied in a larger series of patients. A future area of research revealed by this data is to investigate the results of hCG immunotherapy in parathyroid cancer.

References

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